

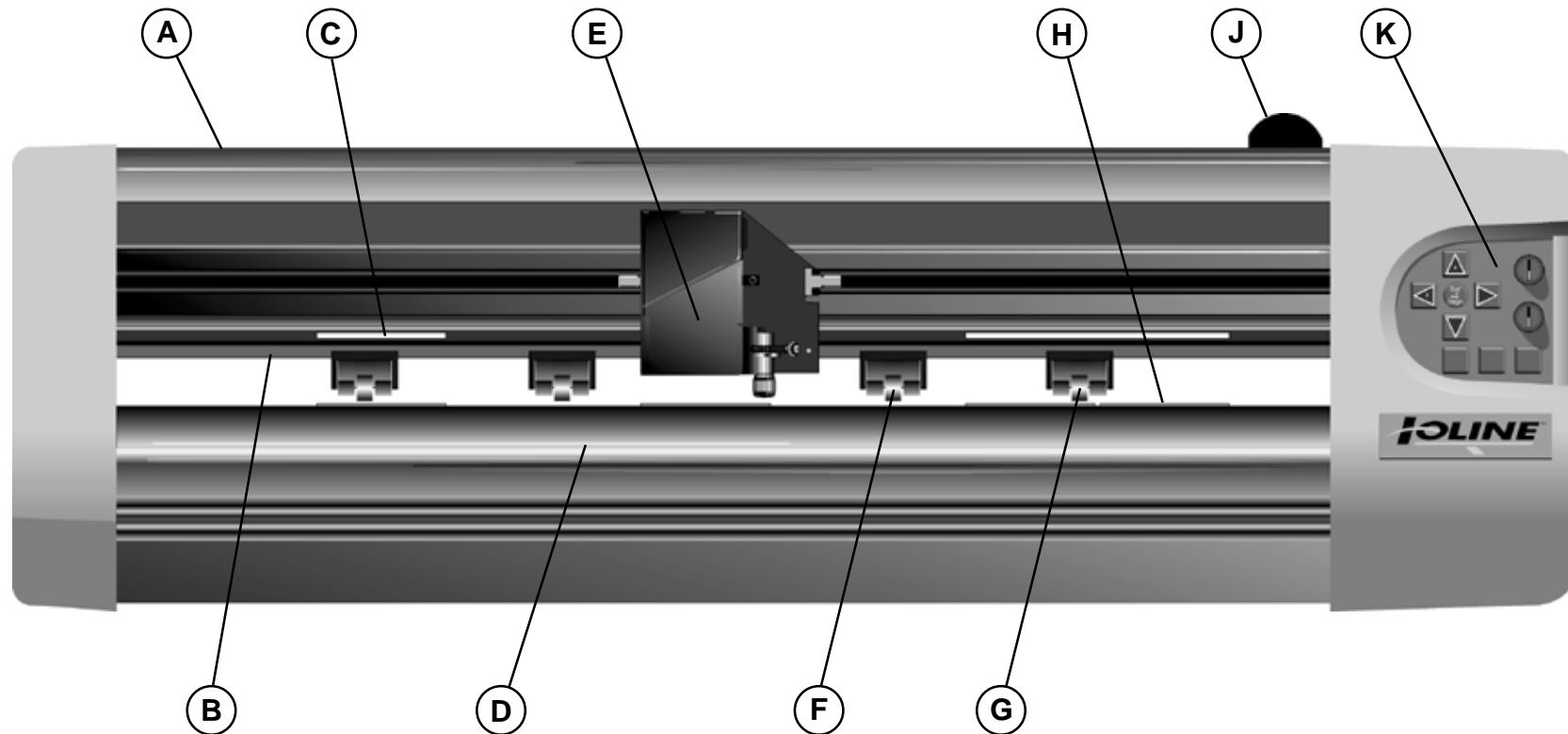
**USING YOUR**



**Ioline™**

**Studio A Plotter**

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September 1999  
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**Figure 1.** The Ioline Studio A plotter.

- A. Dust Cover
- B. Carriage Rail
- C. Drive Shaft Pattern
- D. Platen
- E. Carriage
- F. Idler Wheel
- G. Pinchwheel
- H. Drive Shaft Segment
- J. Pinchwheel Lever
- K. Keypad

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## THE STUDIO A PLOTTER

Thank you for purchasing an Ioline plotter. To make patterns, you also need a computer with design software. After you have used the design software to create a pattern, you will send it as a plot file to the Ioline plotter. The plotter will receive the file and plot the design. Check the following items before you begin making patterns:

- The design software, which helps you design patterns, must be loaded into the computer according to the installation instructions. If you have any questions about the computer or the software, you will need to call the dealer.
- The computer sends a plot file to the plotter to create the patterns. The computer must be assembled and installed correctly before you connect it, by cable, to the plotter.
- The plotter will plot the pattern exactly as you have designed it. The pattern will be plotted from the material that you have loaded into the plotter.
- There is a specialized software program that comes with the plotter called the **Ioline Control Center**. You can load this software utility into a PC compatible computer and use it to adjust plotter settings and perform system diagnostics. Most design software provides drivers for Ioline plotters. Contact Ioline customer service if you need assistance with drivers.

## SAFETY AND PRECAUTIONS

Please read these safety guidelines before beginning operation of the plotter. The plotter uses a very sharp blade when cutting with the optional cutting kit (Ioline P/N 107057). The carriage, drive shaft and media can move quickly. Always observe the following safety precautions:

- Do not allow the material to become suddenly taut between the plotter and a roll of material during plotting. A service loop of unrolled material is required for problem free operation. Using the Roll Feed function (enabled in the Control Center) will create the required service loop by gently pulling a set amount of material from the roll before plotting. Ioline recommends using the Roll Feed function when plotting on a roll of material.
- Do not try to repair the machine without factory authorization. Only qualified service personnel should attempt any disassembly or access to internal components. If external mechanical adjustments are necessary, turn off the plotter and disconnect it from all power sources (both the computer and the wall outlet).
- Be careful with hair, jewelry, or loose clothing near the plotter. They can become caught in the moving mechanical parts.
- Never move the carriage by hand. Use the **Arrow** keys on the keypad and let the machine do it.
- Keep hands away from the carriage when the plotter is in operation. The carriage will automatically move to its right end position when the power is turned on.
- Be careful when lifting the plotter. Hold the bottom surfaces of the plotter to lift or move it.
- Keep fingers away from the drive shaft when the plotter is in operation.
- Use caution when changing a blade in the blade holder in the optional cutting kit. See the **Routine Maintenance** chapter of this user guide for the recommended procedure.
- Be careful when handling the blades in the optional cutting kit. They are sharp and could cause an injury if mishandled. Although the blades are made of an extremely hard material, they are brittle and can break if dropped or mishandled.

# INSTALLATION

## Unpack the Plotter

**Warning:** Do not lift the plotter by the plastic end covers, the dust cover, or the carriage rail. This may permanently damage the plotter. Use the bottom surfaces of the plotter to lift or move it.

Carefully remove the plotter from the box and place it on a flat-stable surface. This procedure requires two people. Save all packing materials and the box. Check the packing list to ensure that all of the accessories are present.

## Assemble the Stand

Assemble the stand according to the Quick Start Guide included in the accessory kit.

## Attach the Plotter

Attach the plotter to the stand. The Quick Start Guide in the accessory kit has details about attaching the plotter. Make sure that the media rollers are properly installed.

## Prepare the Area

Prepare a large clean area to work. Make sure the floor is clean and clear of any obstacles. Pull the plotter away from the wall so the material can move freely.

## Connect the Plotter to the Computer

**Note:** Make sure the computer and the plotter have the power turned off. Ioline recommends using a surge protector power strip for the plotter and the computer.

Connect the plotter to the computer with either a parallel or a serial cable. A parallel cable is provided in the accessory kit. Standard serial cables are available at a computer store or from Ioline if a serial computer connection is necessary. A serial connection to the plotter is required with Windows 3.1 or DOS based software.

The parallel port receptacle on the computer is a 25 pin female receptacle. The serial port is either a 9 pin or 25 pin male receptacle. If the computer has a 9 pin serial port, a 9 to 25 pin adapter is necessary. Adaptors are inexpensive and available at computer stores or can be ordered from Ioline. The plotter will not function if a serial cable is connected to a parallel port.

Select the correct port in the design software or the Control Center after the cables are correctly connected to the computer and plotter. Consult the design software manual or the dealer for further information.

### Important Notes:

1. Always turn off the power to both the computer and the plotter before connecting any cables. This will protect the equipment and reset the plotter if changing between parallel and serial communication.
2. If connected to a parallel port, an LPT port designation (i.e. LPT 1, LPT 2, etc.) must be selected. If connected to a serial port, a COM port designation (i.e. COM 1, COM 2, etc.) must be selected. The choice of a port for the plotter will depend on the ports being used by other devices on the computer. Consult with the dealer if a port is not available.

## Power On

Turn on the computer and the plotter to make sure they work. The plotter power switch is located next to the power cord on the back. The carriage will move toward the keypad side of the machine when the power is turned on. Keep hands and loose clothing away from all moving parts of the plotter. The red LED on the front panel will light when the start-up process is finished.

## Installing the Ioline Control Center

The Control Center is an interface for adjusting parameters to optimize plotter performance. The plotter comes with a CD-ROM which has the Microsoft Windows® 95, 98 and NT (3.51 or greater) version of the Ioline Control Center program.

1. Turn on the power to the computer.
2. Start Windows®.
3. Insert the Ioline CD ROM into the CD ROM drive (usually D:)
4. Select the Start button.
5. Choose Run.
6. Type D:\SETUP (substitute the correct letter if the CD ROM drive letter is not D:) and Click OK.
7. Follow the instructions that appear on the screen.
7. The *Operation* chapter of this manual has details on using the Ioline Control Center software.

# OPERATION

## KEYPAD CONTROLS

The keypad allows access to the main plotter functions.

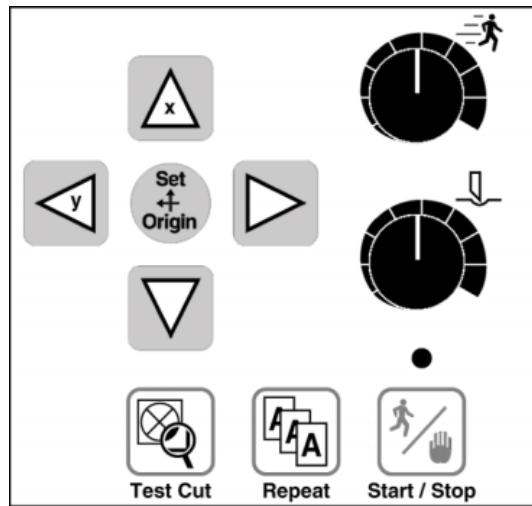


Figure 2. The Plotter Keypad.



### Start/Stop

The **Start/Stop** key connects or disconnects communication between the computer and the plotter. If the **Start/Stop** key is pressed during plotting (**Stop mode**) the machine will stop when the current vector is finished. The **Arrow** keys are active when in **Stop mode**. When the **Start/Stop** key is pressed again, (**Start mode**) plotting will resume exactly where it stopped.

**START** green light    **Arrow** keys inoperable, plotter *online* (ready to receive instructions).

**STOP** red light    **Arrow** keys operable, plotter *offline* (not ready to receive instructions).

### Arrow Keys



Pressing the **Arrow** keys moves the material back and forth or the carriage from side to side. The arrow keys will not work unless the plotter is in **Stop mode** (see **Start/Stop** above).



### Set Origin

The **Set Origin** key sets the initial origin or starting position for the pattern. It is best to set a new origin before plotting each pattern. If a new origin is not set before sending a file to the plotter, the plotter will begin at a point determined by the previous plot file. The software may give the option of selecting this ending point. The plotter will then treat the new file as a continuation of the previous plot. This will affect the repeat function. Refer to the **Repeat** section below. To set a new origin, make sure the plotter is in **Stop mode** with the red light on. Use the **Arrow** keys to move the pen or blade to the intended origin of the plot, then press the **Set Origin** key. The plotter will then accept cut/plot files.

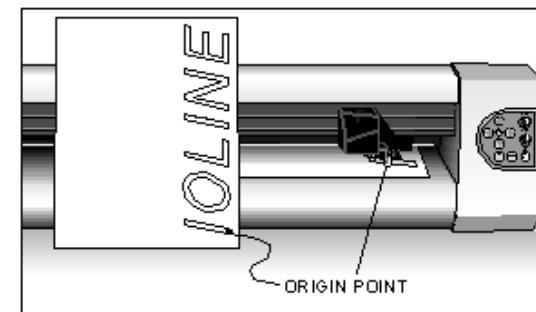


Figure 3. Origin Point.

**Note:** Design software usually refers to the origin as “lower left” because it is the lower left corner of a pattern. Because the plot is usually oriented as shown, it is physically on the right side of the plotter.



Use the **Speed** knob on the front panel of the plotter to adjust the speed. Turn the knob clockwise to increase the speed, or counter-clockwise to decrease the speed. Set the speed according to the type of plotting and material being used. See the **Plotting a Pattern** section of this manual.



### Force

Adjust the force by using the Force knob on the front panel. Turn the Force knob clockwise to increase the force exerted on the pen or blade. See the section on **Plotting a Pattern** for the recommended settings. The range of force available at the knob is adjustable in the Control Center. The available range is 1 - 400 grams.

**Note:** Using too much force can cause excessive drag, damage the pen or blade, or tear the material.



### Test Cut

When pressed, this button will cut or plot a test pattern to help determine the proper force (for knives or pens) and blade exposure for plotting patterns. The test cut will also show the effect of the blade offset and overcut settings in the Control Center. See the section on **Plotting a Pattern or Cutting a Pattern** for details on adjusting force and blade exposure. The Control Center section has details about blade offset and overcut.

1. Make sure that material is loaded in the plotter that the blade holder is installed in the carriage. Position the blade over the material near the right side of the plotter.
2. Check for the red light. Press the **Start/Stop** key if it is not on.
3. Press the **Test Cut** key for one second. The plotter will cut or plot a small test pattern consisting of a circle within a square.
4. Adjust the force and blade exposure up or down with the **Force** knob and the blade foot. Repeat the test cut until the desired line quality is obtained. See the section on **Plotting a Pattern** for details on adjusting force and blade exposure.
5. Successive test plots will be automatically aligned to the left of the last test cut.
6. If the **Test Cut** key is pressed for three seconds the plotter will cut or plot a 1.9 in. x 7.1 in. pattern.



### Repeat

Pressing the **Repeat** key will generate one copy of the most recently created pattern. The plotter must be in **Stop** mode (red LED) to use the **Repeat** key. To start the plot in a new location, move the pen or blade to a new position with the **Arrow** keys before pressing the **Repeat** key. Repeat will do the following:

1. Individual files are repeatable until the **Set Origin** key is pressed and any new data is sent to the plotter. This includes updating settings with the **Update Display** function.
2. If plot files are sent without setting an origin between them, they are stored in memory continuously as if part of one file. This allows the user to repeat multiple files as a single group. Pressing **Repeat** will plot all files sent since the last origin was set (as long as the buffer size is not exceeded, see below).
3. If the file(s) sent exceed the capacity of the buffer (1 megabyte) before an origin is set the repeat function is disabled. This feature allows the plotter to handle files of limitless size. When the buffer has overflowed it no longer holds a complete file so repeat would produce unpredictable results.

**Note:** If an origin is not set between files, two possible unintended results can occur: if the combined plots do not exceed the buffer, repeat will cause them all to be replot or, if the combined files exceed the buffer size, repeat will be disabled.

## THE IOLINE CONTROL CENTER

The **Ioline Control Center** is a utility program that does three things:

- It allows adjustment of settings to tailor output from the computer.
- It allows a completed plot file to be sent to the plotter.
- It includes several diagnostic tests for troubleshooting.

**Note:** To avoid communication port conflicts, do not simultaneously run more than one application that is communicating with the plotter.

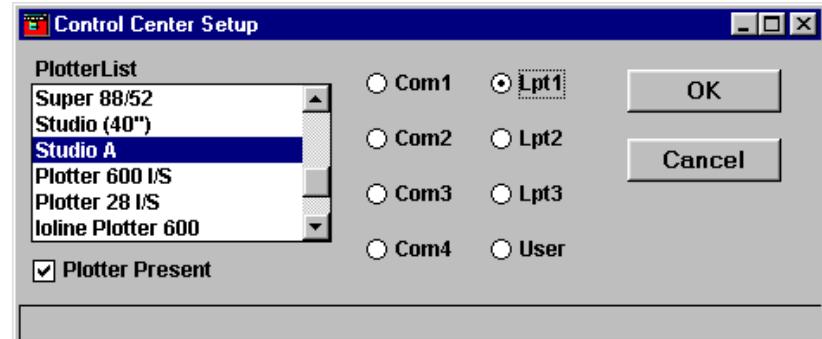


Figure 4. Control Center Setup Screen.

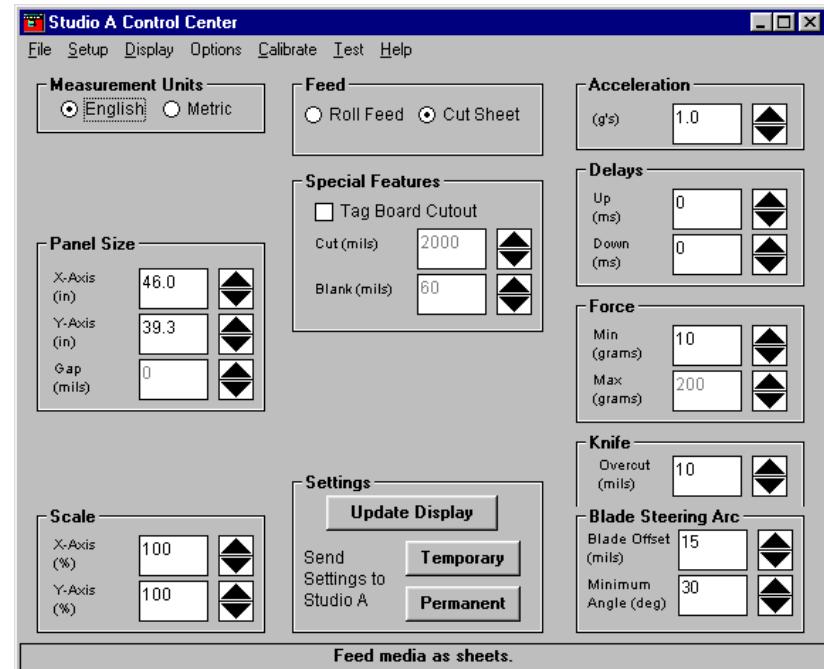


Figure 5. Control Center Main Menu.

## Changing System Settings

A variety of settings are adjustable to fit specific needs:

- The plotter must be in **Start** mode (green LED on) when changing system settings. Press the **Start/Stop** key and make sure the green light is on before changing any settings.
- The Screen Menu displays the primary settings that are adjustable. The Menu Bar contains utilities and less common plotter settings.
- The selected changes will be in effect only after one of the **Send Settings** buttons is pushed.

**Note:** The design software may be able to override the Control Center settings. Check to see if it has by pressing the *Update Display* button before and after a plot is completed. If the settings change, use the design software to modify plotting parameters.

## Menu Bar Features

The Ioline Control Center provides comprehensive help files to explain the functions of the software options. Below is a brief summary Menu Bar items.

### File

Send Cut/Plot File	Send a plot (.plt) file to the plotter.
Open Settings File	Restores saved settings files.
Save Settings As	Allows user to save settings files.
Exit	Exits the Control Center program.

### Setup

Plotter Setup	Allows user to select the correct plotter model.
COM Port Setup	Allows user to select the communications port.

### Display

Plotter Settings	Allows user to view current plotter settings.
Factory Defaults	Allows user to view and restore original factory settings.
ROM Version	Displays installed ROM version.
Memory Buffer	Displays installed memory buffer size.
Blade Status	Displays whether or not the blade holder is installed.

### Options

Filtering	Allows user to toggle Filtering on and off.
HGPL Setting	Allows user to select HGPL language.
Install New Firmware	Installs new firmware into the plotter.

### Calibrate

Calibrate Plotter	Allows user to calibrate plotter.
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### Test

Serial Test	Allows user to test serial communications.
Computer Port Test	Allows user to test computer port.
Plotter Port Test	Allows user to test plotter port.

### Help

Contents	Lists contents of help files.
About	Provides Control Center version information.

## Screen Menu Options

### Measurement Units

English or Metric units are available when adjusting settings.

### Panel Size

The **Panel Size** is the maximum area the plotter can use for plotting. The factory set (and maximum) X-axis panel length is 838 inches long (2129 cm). The maximum Y-axis panel size is 40 inches. The material moves along the X-axis; the carriage moves along the Y-axis. When plotting on a **Cut Sheet** the panel values should be adjusted to less than the sheet size.

The **Gap** setting is used to set the gap correction between panels. The maximum range for setting gap is +/- 1 inch. See the section on *Adjusting Gap* for more details.

### Scale

The factory-set **Scale** is 100%. The plotter will produce a plot in the exact size of any plot file that is sent. If the scale is 50%, the plotter will produce a plot that is half the intended size. The scale of the plotter can range from 1% to 999%. **Note:** Both X and Y axes are set independently.

### Feed

Select **Roll Feed** in the Control Center if you are plotting on a roll of media. When you send a plot with roll feed enabled, your plotter will automatically pull the amount of media that is set in the design software for the X axis frame size from the roll and create a service loop in the rear.

Use the **Cut Sheet** option if you are plotting on a single sheet of material. The **Panel Size** can be set to the sheet size so that the plot does not leave the media. If Cut Sheet is selected when plotting from a feed roll, you will have to manually pull enough material off the roll to create a service loop behind your plotter. **Do not allow the material to become taut between the plotter and the feed roll during plotting.** **Cut Sheet** is enabled as the default setting.

### Special Features

See the *Cutting a Pattern* section for more details on using the Tag Board Cutout feature.

**Tag Board Cutout - Tag Board Cutout** is automatically enabled *in the plotter* when a knife is inserted in the carriage. The Control Center, however, cannot automatically recognize when a tool is changed. Pressing the **Update Display** button (see below) with the plotter in **Start** mode (green LED on) will update the knife status. The **Cut** and **Blank** parameters are adjustable once the Control Center is updated.

**Cut** - The **Cut** value is the length, in thousands of an inch (mils), that the blade will **cut** when cutting the segmented line for pouncing or tag board cutout. The default length is 40 mils (.04 inches) for pouncing and 2000 mils for tag board. The maximum is 4000 mils for pouncing and 5000 mils for tag board. The minimum is 40 mils for pouncing and 50 mils for tag board.

**Blank** - The **Blank** value is the length, in thousands of an inch (mils), that the blade will **not cut** when plotting the segmented line for tag board cutout. The default length is 600 mils (.6 inches) for pouncing and 60 mils for tag board. The maximum is 4000 mils for pouncing and 5000 mils for tag board. The minimum is 40 mils for pouncing and 50 mils for tag board.

### Update Display

**Note: The design software may override the Control Center settings. Check to see if it has by pressing the *Update Display* button before and after a plot is completed. Check the plotter setup screens in the design software to make adjustments if necessary.**

Selecting this option will update all of the screen values with the current settings stored in the plotter. For example, using **Update Display** after a blade is inserted in the carriage will update the Control Center and allow access to the **Tag Board Cutout** parameters.

### Send Settings to Plotter: Temporary

After changing any setting, the changes must be sent to the plotter. If **Send Settings to Plotter: Temporary** is selected, all of the displayed settings will be used for the current session. When the plotter is turned off these settings will be lost and the previous permanent settings will be in effect when the plotter is turned on again. If any settings are changed, repeat the **Test Cut** procedure to ensure that the results are satisfactory.

### Send Settings to Plotter: Permanent

If **Send Settings to Plotter: Permanent** is selected, all of the displayed settings will be sent to the plotter and will be saved for all subsequent sessions, even after turning off the plotter.

### Acceleration

The factory set acceleration is 1.0 g. The acceleration setting determines how quickly the pen or blade will reach full speed when starting or ending a line. Use the Control Center to change the setting within a range of 0.1 to 1.0 g. For long or difficult plots, or when trying to achieve maximum accuracy, use lower acceleration settings.

### Up/Down Delays

The factory set up and down delays are both 0 milliseconds (ms) or 0 thousandths of a second. The delay setting controls the amount of time, in milliseconds, the plotter pauses after lifting or lowering the pen or blade. Under normal circumstances this setting will not require adjustment. Thick material (e.g. tag board) may require a delay of 25 to 50 ms.

### Force

You can change the minimum force setting for the **Force** control knob on the keypad. The factory set minimum is 10 grams. The maximum values are fixed at 175 grams when plotting with a pen or 400 grams when cutting.

### Blade Overcut

Blade overcut is the distance the blade travels beyond the end of a cut. Blade overcut ensures that each cut actually reaches the point where one cut line meets and slightly overlaps another cut line. This ensures that all of the pieces of the pattern will be cut completely, with no undercuts. The factory set blade overcut is 10 mils. This setting is ignored when a pen is installed in the carriage.

### Blade Steering Arc

#### Blade Offset

The blade offset is nominally 15 mils (or 47 mils on some blades), but specific blades can vary within a tolerance. For close work, making some tiny test plots at several settings, then picking the best one, can improve accuracy. This setting is ignored when a pen is installed in the carriage.

#### Minimum Angle

This is the minimum angle for which the plotter blade will perform a blade steering arc. For a very tiny plot, a small or zero angle can be specified. For larger plots a greater angle of up to 45 degrees is best. The factory set value works well with most files. Adjusting this setting for small plots may improve performance. This setting is ignored when a pen is installed in the carriage.

## PLOTTING A PATTERN

Before plotting a pattern, turn the plotter on, load it with material, install a pen, and set an origin. These steps are outlined below. In most cases the design files are sent directly from the design software to the plotter. If necessary, use the **Ioline Control Center** software to send design files, adjust settings and test plotter communication.

## General Guidelines

1. **Never let the material become suddenly tight between the plotter and a roll of material during plotting.** A service loop of unrolled material is required for problem free operation. Ioline recommends using the **Roll Feed** function (enabled in the Control Center). It will create the required service loop by gently pulling a set amount of material from the roll before plotting.
2. **Prepare a large clean area to work.**
3. **Use the Paneling feature in the design software for long plots.** Paneling will restrict the length of any X-axis move. Ioline suggests an X panel size of 10 to 20 inches with no panels greater than 40 inches.
4. **Force.** Incorrect force can cause misalignment problems over the range of a long plot. If the force is too high, the material may skew.
5. **Lower Acceleration and Speed.** Use the Control Center program to set the acceleration to 0.5 g or less. Lower acceleration will help with overall accuracy, especially in the transition between frames. Set the **Speed** knob to 50 percent or less. Lower speed helps prevent the material from kinking or buckling.

## Power On

Turn on the computer and the plotter. The plotter power switch is located next to the power cord on the back. The carriage will move when the power comes on. Keep hands and loose clothing away from all moving parts of the plotter. The red light on the front panel will come on when the start up procedure is finished.

## Loading the Material

**Note: If Roll Feed is not enabled in the Control Center, do not allow the material to become taut between the plotter and the material roll. Manually create and maintain a service loop in the rear. See *Roll Feed* in the *Ioline Control Center* section for more information.**

## Load the Material Roll on a Media Roller

Testing at Ioline has revealed that loading media using a roller as an axle produces the best results. A less effective option is to place the roll of material between the media rollers so that it is cradled on the outer diameter.

1. Insert a media roller through the material roll.



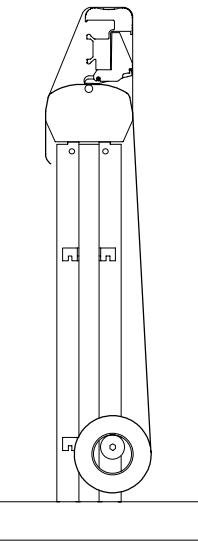
**Figure 6.** Inserting a media roller through the material roll.

2. Install the media roller in the rear-lower notch in the leg as shown below.



**Figure 7.** Material roll hanging on a media roller installed in the stand.

3. The material should unroll from behind the roll.



**Figure 8.** The correct material path.

## Loading a Material Roll on the Locking Flanges

Testing at Ioline has revealed that loading media using a roller as an axle produces the best results but some customers prefer to use locking flanges.

**Note:** The locking flanges will support a 200 yard material roll or less. To use the flanges:

1. Insert the flanges into the openings at each end of the material roll. Leave a gap of 1/8". Tighten the knobs until the flanges are secure in the tube.



Figure 9. Inserting a flange into the material roll.

2. Install the locating collars on the front media roller as shown in the figure below. Slide the collars apart until they are the width of the material roll and the right collar is roughly an inch from the right stand leg.



Figure 10. Sliding the locating collar on the media roller.

3. Insert the flanges on the material roll into the locating collars. Make adjustments as necessary. The material should unroll from behind the roll.



Figure 11. Positioning the flanges in the locating collars with the paper unrolling from behind the machine.

## Aligning the Material and Pinchwheels

It is important to align the material roll with the platen before plotting. Use the, "Typewriter Method," described below.

1. Lift the pinchwheels with the pinchwheel lever on the right side of the plotter. Thread material under the pinchwheels and through the machine. Pull down enough material to reach the media rollers on the stand.
2. Roughly align the roll and material so that the edges are overlapping the wide-right-drive shaft segment and one of the smaller segments. Use the drive shaft markers on the carriage rail to find the drive shaft segments when they are covered by material.
3. Position the outer-pinchwheels on the material about one inch (2.5 cm) from the edges. Use the drive shaft markers on the carriage rail to find the drive shaft segments when they are covered by material.

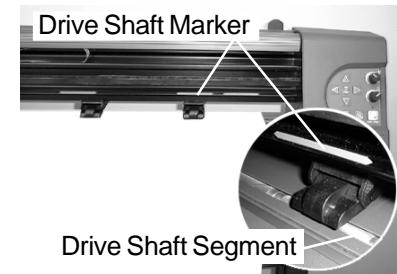


Figure 12. Using the markers to find drive shaft segments.

4. Slide the idler wheels so that they are evenly spaced between the outer wheels while remaining over a drive shaft segment.
5. With the pinchwheels up, align the edge of the material with the edge of the roll. Lower the pinch wheels.



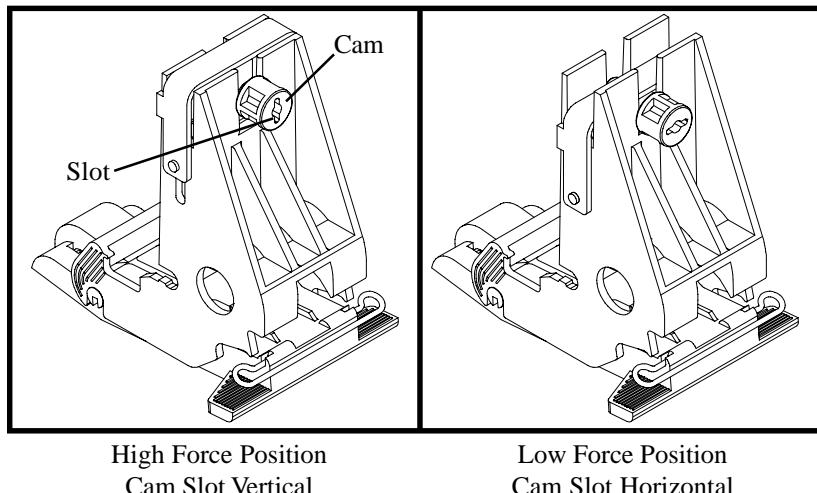
Figure 13. Aligning the material with the edge of the roll.

6. **Warning:** *Do not let the material become suddenly tight between the plotter and material roll.* Check alignment by using the arrow keys to move the material forward and back. Observe the material edge to make sure it is running straight.

## Adjusting the Pinchwheels

The plotter has pinchwheels with adjustable spring force. This allows maximum force (24 lbs.) for holding tag board (which requires more force for better tracking) or less force (8 lbs.) for lightweight materials like paper. The pinchwheels can also be set in a position that keeps them completely off the surface so that the inner pinchwheels will not interfere with pen plotting.

1. The force is adjusted by turning a cam on the back of the pinchwheel.
2. Insert a flat screwdriver into the slot and turn the adjustment cam 90 degrees. When the slot is vertical on the outer wheels the force is 24 lbs. A horizontal slot indicates 8 lbs of force. The inner pinchwheels are adjustable to 12 lbs. (vertical setting) or 4 lbs. (horizontal setting).

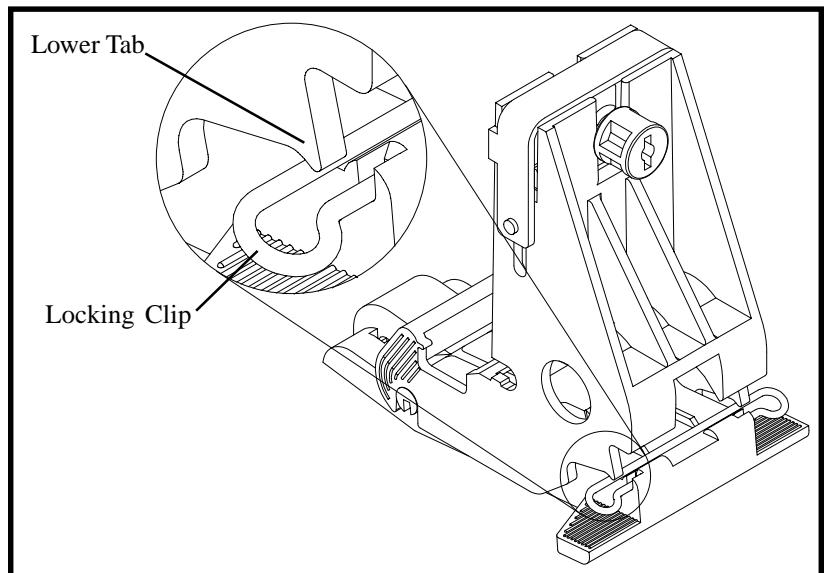


*Figure 14. Adjusting Pinchwheel Pressure.*

## Locking the Pinchwheels Off of the Platen

The idler pinchwheels have a locking feature that will hold them off of the platen during plotting. This will reduce ink smearing if using a heavy ink marker for making patterns.

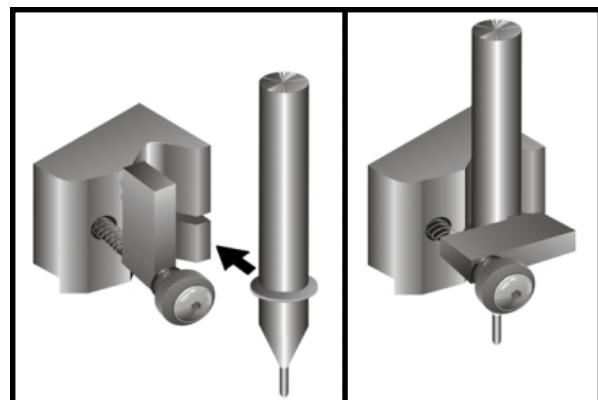
1. Lift the idler pinchwheels off the platen with the pinchwheel lever.
2. Press on the handles at the rear of the idler pinchwheel arm.
3. Flip the locking clip into position with both thumbs. Make sure that the clip is under the lower tabs.
4. When the pinchwheels are lowered onto the platen the idlers will stay in the up position.



*Figure 15. Locking the Idler Pinchwheels Off of the Platen.*

## Installing a Pen

1. Rotate the clamp screw until there is enough room to insert a pen. Make sure that the clamp is rotated up out of the way.
2. If using a plotter pen, slip the flange into the slot in the carriage jaw. If using a regular pen, position the tip 1/8 inch off of the platen when the jaw is in the up position. The plotter can hold any pen with a maximum barrel diameter of 7/8" (22 mm).
3. Tighten the clamp screw until the pen is secure.



*Figure 16. Installing a Pen in the Carriage Jaw.*

## Guidelines for Plotting Pens

Refer to the table below for recommended settings for a variety of pen types. Use **Test Cut** to verify the best settings for the pen/media combination. These settings may vary due to manufacturer, age, and temperature of the media.

Paper	Pen	Speed	Force grams	Comments
BMI Super Lay-Flat™ or equivalent high quality bond	HP-style ballpoint	Maximum	60-80	15ms pen up/ 15ms pen down delays
"	BIC® Round Stic ballpoint	Maximum	180-200	
"	Sanford Sharpie	Maximum	70-100	
"	HP-style fiber tip	Medium	70-100	
—	Plastic tip	—	—	Not Recommended
—	Ceramic tip	—	—	Not Recommended
—	Liquid ink/ Metal tip	—	—	Not Recommended

**Table 2. Plotter Pen Guidelines.**

## Sending a Plot File to the Plotter

Always load the plotter and make test plots to determine the correct settings before sending any files. See the **Adjusting Blade Exposure and Force** section for more details.

**Important:** Make sure that the carriage and material are in the proper position and that an origin is set by pressing **Set Origin** on the keypad (LED is green).

Send the file directly from the design software following the directions in the documentation.

or...

From the **Ioline Control Center**:

1. From the menu bar select **File, Send cut/Plot File**.
2. Either enter the path and file name of the plot or select the file from the directory\file lists in the dialog box. For example, the path might be:

C:\IOLINE\<filename>.plt.

4. Select OK.

## Pausing Plotting

**Warning:** Do not turn the material roll or pull material tight between the drive shaft and the material roll while plotting is paused. If the material becomes suddenly tight, the machine will jam.

1. Press the **Start/Stop** key to place the plotter in **Stop** mode (red LED).
2. When plotting is interrupted, the carriage and material can be moved with the keypad **Arrow** keys.
3. Press the **Start/Stop** key to resume plotting. The plotter will return to the original plotting position and continue plotting where it stopped. The keypad LED will change from red to green.

## Cancelling a Plot

1. Press the **Start/Stop** key to place the plotter in **Stop** mode (red LED).
2. Cancel the plot from the design software (refer to the design software manual or consult the software dealer) or from the Control Center software by clicking on the **Abort** button in the **Send File** window. **Note:** If this step is skipped the plot will continue when a new origin is set.
3. Press the **Set Origin** key to make the plotter delete the plot data it has already received but has not yet plotted.

## Plotting Long Patterns

Plotting long patterns require that the pinchwheels are correctly spaced, the material is aligned properly and some Control Center settings are properly adjusted. These suggestions are detailed below.

1. **Align the Material and Pinchwheels.** See the previous section on *Aligning the Material and Pinchwheels* to ensure that the plotter and material are aligned properly.
2. **Lower Acceleration and Speed.** Using the Ioline Control Center program, set the **Acceleration** to 0.5 g or less. Set the **Speed** knob on the keypad to 50 percent or less. Lower acceleration and speed will help with overall accuracy, especially in the transition between frames.
3. **Use Roll Feed.** Roll Feed will gently pull a set amount of material from the roll. This helps the material feed into the plotter more accurately and keeps it from “jerking” from the roll. Roll Feed also helps to set up a drive track in the material which helps keep the material aligned. Roll Feed is enabled in the Control Center. Set **Roll Feed** to ON and set the Loop Size to the same length or longer as the Panel Size in the design software. This will help tracking accuracy. If **Roll Feed** is OFF, manually maintain a service loop of material behind the plotter to prevent, “jerking,” material from the roll.
4. **Use the Paneling feature in the design software.** Paneling will restrict the length of any x-axis move. Ioline suggests a panel size of 10 to 20 inches. With most pattern making software, the paneling feature allows the placement of a panel between characters.
5. **Let the software help.** Use the *automatic sorting, ordering or contour ordering* feature in the design software (some software programs automatically handle this process). This will reduce the number of time consuming back and forth and side to side movements. Wear on the material backing (as well as the media) is also decreased which will improve tracking. The more complex the file, the more difficult the problem.
6. **Build a material slide.** Cut two cardboard pieces that are the width of the stand and large enough to lean against the plotter stand legs. This prevents the material from going under the machine and buckling or tangling with material on the roll.
7. **Excessive Force** Incorrect plotting force can cause misalignment problems over the range of a long plot. If the force is too high, the material may skew. If the blade depth is set too deep, it could cut all the way through the material and/or cause the material to become jammed under the blade.

## Adjusting Gap

Gap affects the size of the gap between each plotted frame in the direction of material movement (X axis). The gap value must be set to achieve optimal performance if the material slips during roll feed. **Note:** *Most paper does not require a gap adjustment (Gap = 0).* The gap is affected by material size and weight, panel size and slightly by the size of the material roll. When determining the frame gap value always use the same material and settings that will be used when plotting normally. To determine the necessary frame gap use the following procedure:

1. Check that **Roll Feed** is enabled in the *Control Center* and the plotter is updated with the **Send Settings** command.
  2. Send a pattern to the plotter that has two consecutive panels. Make sure that the panels are the same size.
  3. Measure the frame separation or overlap in the X axis as accurately as possible.
  4. If the frames are separated enter the measurement as a negative number in the frame gap field. For overlapping enter the measurement as a positive number in the frame gap field.
- Example:** If the plot shows an overlap of .200 inches, set the frame gap in the *Control Center* to 200 (positive). If the plot shows a gap of .200, set the frame gap in the *Control Center* to -200 (negative).
5. With the plotter in Start mode (green LED) send settings with the **Temporary** or **Permanent** screen options.

## CUTTING A PATTERN

With the optional cutting accessory kit (Ioline P/N 107057), you can perform cutting as well as plotting. Typical material for cutting patterns is 150 pound tag board. Lighter as well as slightly heavier materials can also be cut.

Before you cut a completed design; turn your plotter on, load it with tag board, install the knife assembly, and set a start point. These steps are outlined below. As with plotting on paper you may send the plot file from the design software or from the **Ioline Control Center**. The *Plotting a Pattern* section outlines sending, pausing and cancelling plot files.

### Basic Operation

Tag board is handled differently than paper because higher pinchwheel pressure and more blade force is required. When the blade is inserted, the plotter detects it and will automatically cut a segmented line. The segmented cut line keeps the pattern pieces in place during plotting. When cutting is complete the pattern is easily separated.

The dashed line pattern can be changed with the Control Center. This is useful for adjusting cut-lengths for very large or very small patterns. Adjustment can also make removing the patterns easier. The Control Center must be updated with the **Update Display** button after a knife is inserted to allow adjustment of the tag board settings. The default settings will produce good results with most patterns.

### Changing the Pinch Wheels

Heavier pinchwheel pressure is required for cutting tag board.

1. Raise the pinch wheel lever on the right side of the plotter
2. Set the outer pinchwheels to 24 pounds (cam slot is vertical) following the procedure in the *Adjusting the Pinchwheels* section.
3. Set the inner idlers to 4 pounds (cam slot is horizontal) following the procedure in the *Adjusting the Pinchwheels* section.

### Loading and Aligning the Material

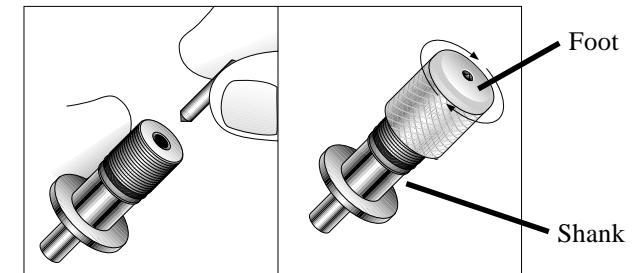
The method for loading tag board is the same as is described in the **Plotting a Pattern** section. Ioline has determined that hanging the tag board roll on a media roller (using the roller as an axle) will produce the best results when using a roll of media. Make sure the pinch wheels are positioned correctly.

## Installing a Blade and Foot

**Note:** Using a hard surface to insert the blade may damage it.

A blade and a blade holder are included in the accessory kit. The blades are sharp and brittle and the tips can chip or break. Be very careful when handling the blades.

1. Remove the foot from the assembly by unscrewing it counterclockwise.
2. Slide the blade into the hole in the blade holder until it bottoms out. The blade should spin freely.
3. Screw the foot onto the shank (clockwise) as shown. Stop before the blade emerges.



Figures 17. Installing the Blade and the Blade Foot in the Holder.

## Installing a Blade Holder

1. Rotate the clamp screw until there is enough room to insert the blade holder or pen. Make sure that the clamp is rotated up out of the way.
2. Slip the flange into the slot in the carriage jaw.
3. Tighten the clamp screw until the blade is secure.

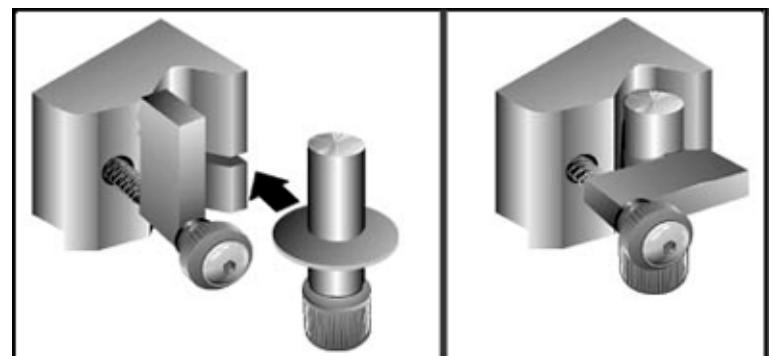
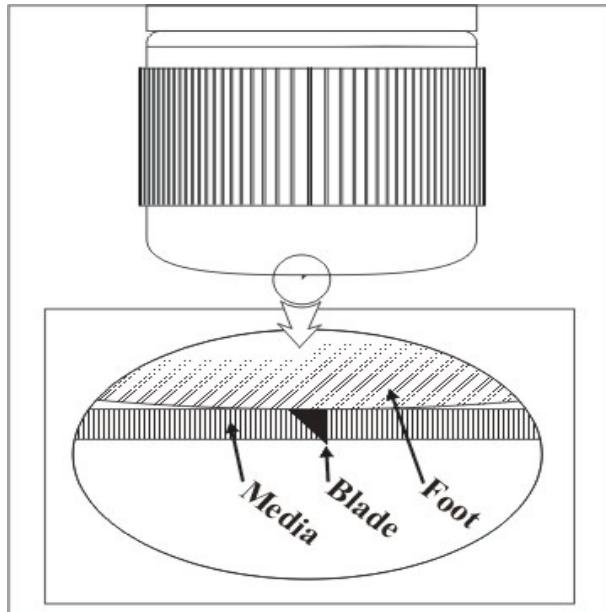


Figure 18. Installing a Blade Holder in the Carriage Jaw.

## Adjusting Blade Exposure and Force

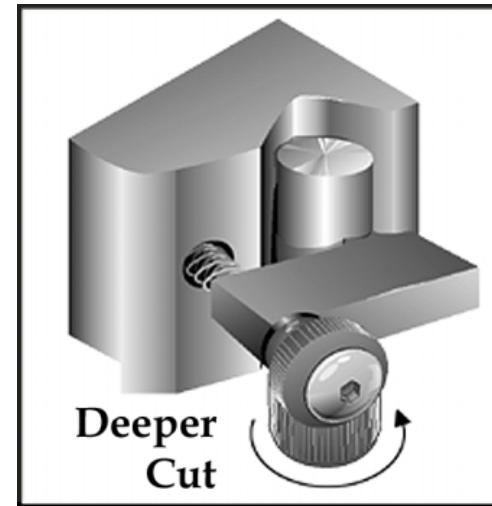
Properly adjust blade exposure and force to achieve good plotting results.

### Adjusting Blade Exposure



**Figure 19.** Proper blade exposure that barely cuts through the tag board.

1. Make sure that the maximum force setting in the Control Center is 400 grams, see the section on *Changing System Settings* for more details. Turn the **Force** knob on the keypad clockwise to maximum. Set the **Speed** to 50% with the keypad knob.
2. Check that the blade tip is barely visible when viewing the blade from the side. This technique approaches the correct blade exposure from too little with no chance of having too much (which could damage the blade).
3. Press the **Start/Stop** button on the front panel until the LED is red. Move the carriage until the blade is near the right edge of the material.
4. Press the **Test Cut** key for one second. The plotter will cut a test pattern. There is no cutting if the initial foot adjustment was correct.
5. Turn the foot 1/8 turn upward (clockwise from below). Press the **Test Cut** key. **Note:** Successive plots will automatically be positioned to the left of the previous test cut. The material should have a light cut pattern on it.



**Figure 20.** Turning the foot to add more blade exposure.

6. Continue increasing the blade exposure and making test plots. The test pattern will cleanly separate from the surrounding material (except for the small blanks connecting the pattern and remaining material) when enough blade is exposed.

### Force Adjustment:

For 150 pound tag board, cuts are generally made at or near maximum force (400 grams). You should use the following method if you want to minimize force or if you are using a more-easily cut material.

1. Turn the force knob down slightly, about one mark, and repeat the test cut. If the test cut does not cut completely, full force should be used.
2. If the test cut is complete, turn the force down again and repeat the test cut. Continue until the cut is incomplete. This indicates that there is not enough force to push the exposed blade fully into the tag board. At this point turn the force knob up one mark, which is just enough.

### Verification:

1. Press the **Test Cut** key for 3 seconds. The plotter will plot a 1.9 inch x 7.1 inch design.
2. If the pattern does not separate cleanly, try another 1/8 turn upward (counter clockwise from above) of blade exposure and a very slight increase in force.

## ANNOTATING BEFORE CUTTING

The plotter can annotate a tag board pattern before cutting it out. You can change from plotting to cutting by simply changing tools and, if necessary, adjusting the **Force** knob. If you plan to switch between cutting and plotting, it is best to do both test cuts and test plots before starting. The Fisher pens that Ioline provides work well with 150 - 175 grams, and cutting generally works well with 300 - 400 grams. It is not unusual to cut and plot using the same **Force** knob setting because the range adjusts automatically for a pen or knife. Other pens usually require much lower force, so adjust the force knob when switching to plotting from cutting.

### Perform Test Cuts and Prepare the Files

Always load your plotter and make test plots and test cuts to determine the correct settings before sending any files. See the **Cutting** and **Plotting** sections for more details. Some design software will make a single file that will pause for changing tools. If this feature is not available:

1. Prepare two versions of your file, one containing only the lines you want plotted (the annotation plot), and the other containing only lines you want to cut (the cut file).
2. If your software lets you control the ending position, have the annotation plot return to its starting position when plotting is finished. Then you will be correctly positioned to begin the cut file. If your plot does not return to the original position you may need to make a mark - a dot for example - at the starting corner of the annotation plot. Your software may move the starting corner because the plot is smaller when the cut lines are removed.

### Plot the Annotation

1. Insert the pen and set the force for plotting.
2. Set a start point. If you will need to manually return to this point before cutting, push the pen down to make a mark.
3. Send the plot version of your file to the plotter.

### Cut the Pattern

1. Insert the knife and set the force for cutting (if necessary).
2. Position the knife over the starting mark of the annotation plot (if your software does not automatically do it). Press the **Start Point** key.
3. Send the cut version of your file to the plotter.

## COMMUNICATION TESTING

There are three communication diagnostic tests available in the Control Center. These tests are designed to help determine if a communication problem exists and to isolate where the problem is occurring.

A diagnostic module is required to run two of these tests. It will work on both the computer and plotter serial (COM) ports. It is available from Ioline or an authorized dealer.

### Communication Test

This test will determine if communication is working between the computer and the plotter on the parallel (LPT) or serial (COM) ports. Run this test from the Control Center, Test menu. The diagnostic module is not required to run this test.

1. Turn the plotter off. Connect the plotter to the computer with either a serial or parallel port cable. See the section *Connect the plotter to the Computer* in the *Installation* chapter for more details.
2. Start the Ioline Control Center. Select **Test, Communication Test** from the menu bar at the top of the window.
3. Turn on the plotter while holding down the **Test Cut** key on the keypad. Hold down the **Test Cut** key until the plotter beeps and the light flashes three times. The plotter is now in **Test Mode**.
4. If testing the serial (COM) port, press the **Start/Stop** key on the plotter and verify that the handshake line (CTS) status displayed on the computer screen toggles **On/Off**. Leave the handshake line **On**. This is not necessary for the parallel (LPT) port.
5. Press the **Repeat** key to switch the plotter into **Echo** mode. The green light will come on.
6. Press a key on the computer and verify that the character transmitted equals the character received. If the characters match then the connection between the plotter and computer is working properly.
7. Select **Exit** after the communication test is complete.
8. Turn off the plotter at the end of the test. This will exit **Test Mode**.
9. The next two tests are not necessary if serial (COM) port testing is successful.

## Testing the Plotter Serial Port

The diagnostic module is required for this test.

1. Connect the diagnostic module directly to the plotter COM port.
2. From the Control Center main menu, select **Test, Plotter Port Test**.
3. Turn on the plotter while holding down the **Test Cut** key on the keypad. Hold down the **Test Cut** key until the plotter beeps and the light flashes three times. The plotter is now in **Test Mode**.
4. Press any **Arrow** key on the keypad to transmit and receive characters. Verify that the plotter beeps.
5. Turn off the plotter at the end of the test. This will exit **Test Mode**. If this test fails, the plotter port is faulty.

## Testing the Computer Serial Port

The diagnostic module is required for this test.

1. Connect the diagnostic module directly to the COM port on the computer. If the computer COM port has a nine pin connector, use a 9 pin to 25 pin adapter between the COM port and diagnostic module.
2. From the Control Center main menu, select **Test, Computer Port Test**.
3. Verify that the COM port selected is the correct one. If it is not, select the proper COM Port.
4. Verify the CTS handshake line is on.
5. Press any key on the computer keyboard and verify that the character transmitted equals the character received.
6. Select the **Exit** button at the end of the test. This will exit **Test Mode**. If this test fails, the computer port is faulty.

## TROUBLESHOOTING

If the system is not working correctly the problem could be with the computer, the cable, the design software, or with the plotter. Changes to the computer operating system or the installation of new peripherals or software might cause conflicts. If the computer or the design software cause a problem, consult the computer or software manuals or call the manufacturer or dealer.

If the problem is with the plotter, begin by making sure power is on and that the cable between the machines is connected correctly. Test the connection with the methods described in the *Communication Testing* section. Consult the following chart for more detailed troubleshooting techniques:

### Troubleshooting Chart

<i>If your plot does not start at the correct point on the material:</i>	
Possible Cause	Solution
1. The origin selected in your software is different than the one you selected on your plotter. 2. You have not set an origin.	1. Select them so they coincide; usually lower-left (which is on the right side of the plotter, see Figure 3). 2. Set an origin.
<i>If pressing the Repeat key does not repeat the previous plot:</i>	
Possible Cause	Solution
1. Buffer Overflow: File size-exceeds buffer size.	1. See the <i>Operation</i> chapter, <b>Repeat</b> section.
<i>If you have sent a plot file, but nothing happens:</i>	
Possible Cause	Solution
1. Your plotter is in <b>Stop</b> mode. 2. A communication problem has occurred. 3. You have not set an origin.	1. Press the <b>Start/Stop</b> key to put your plotter in <b>Start</b> mode 2. Perform the diagnostic tests or call your dealer. 3. Set an origin.
<i>If you have sent a plot file and the output is erratic:</i>	
Possible Cause	Solution
1. You have sent the plot file with the wrong plotter language.	1. Make sure the correct driver setting is selected.

Table 3. Troubleshooting Chart.

<i>If the blade tears the material or skips when cutting:</i>	
<b>Possible Cause</b>	<b>Solution</b>
1. The blade is dull or broken. 2. The blade force is too low. 3. The blade is dirty.	1. Replace the blade. 2. Increase the blade force. 3. Clean or replace the blade.
<i>If the corners of the plots or cuts are not completely meeting:</i>	
<b>Possible Cause</b>	<b>Solution</b>
1. The material is slipping. 2. The blade is dull or broken. 3. The blade overcut is too low. 4. The offset is incorrect.	1. Clean the drive shaft. 2. Replace the blade. 3. Use a higher blade overcut value. 4. Refer to the <b>Blade Offset</b> section.
<i>If you have difficulty weeding the completed pattern:</i>	
<b>Possible Cause</b>	<b>Solution</b>
1. Not enough force. 2. The blade is dull or broken. 3. The blade overcut is too low. 4. The offset is incorrect.	1. Increase force setting. 2. Replace the blade. 3. Use a higher blade overcut value. 4. Refer to the <b>Blade Offset</b> section.
<i>If there are tracking errors:</i>	
<b>Possible Cause</b>	<b>Solution</b>
1. Pinch wheels are positioned on a smooth section of the drive shaft. 2. Force is set too high. 3. Acceleration is set too high. 4. Speed is set too high. 5. The material is kinked as it accumulates in the front and rear of the plotter.  6. Dirty drive shaft.	1. Move the pinch wheels to a new location. 2. Reduce the force. 3. Set the acceleration to .5g. 4. Reduce the speed to 50% or less. 5. Make sure the material remains smooth, flat, and square during loading. Clear the media path in the front and rear of the plotter.  6. Clean the drive shaft.

Table 3-Continued. Troubleshooting Chart.

**LED Codes**

<i>If the front panel green light is blinking once:</i>	
<b>Possible Cause</b>	<b>Solution</b>
The carriage is jammed.	Turn off your plotter and clear away any debris or jammed material.
<i>If the front panel red light is blinking once:</i>	
<b>Possible Cause</b>	<b>Solution</b>
The drive shaft is jammed.	Turn off your plotter and clear away any debris or jammed material
<i>If the front panel red light is blinking twice:</i>	
<b>Possible Cause</b>	<b>Solution</b>
Buffer overflow or communication problem.	Perform the diagnostic tests or call your dealer.
<i>If the front panel red and green lights are blinking alternately:</i>	
<b>Possible Cause</b>	<b>Solution</b>
1. Plotter language syntax error.  2. Bad or corrupted file.	1. Make sure the correct driver is selected.  2. Recreate file.

**Note:** if any yellow lights are visible on the keypad, take note of how many times the light blinks and contact Ioline Customer Service immediately. Ioline contact information is available at the end of this manual.

Table 4. LED Codes.

## Troubleshooting the Parallel Port

If the computer communicating with the plotter is on a network, it is common for LPT 1 to be ‘captured’. If a port is captured, the data is redirected to the network instead of flowing out of the parallel port on the back of the computer. Ending the capture will allow data to flow normally from the computer to the plotter. Note: These instructions may vary depending on the Windows version.

1. Click the Start button, select Settings and then click Printers to open the Printers window.
2. Right Click the printer icon for a network printer and select Properties.
3. Click on the ‘Capture Settings’ or ‘Details’ tab.
4. Click on ‘End Capture’. Select LPT 1 and click ‘OK’.
5. Assign the network printer path to another parallel port designation like LPT 3. Set the printer to use that port or select a network print que path.

BIOS settings can also have an effect on parallel port performance. The plotter supports only SPP parallel port communication. ECP and EPP modes are not supported. These instructions include editing the PC BIOS to ensure that the port is in the proper mode prior to starting Windows.

1. Click the Start button, select Settings and then click Control Panel to open the Control Panel window.
- 2 Double Click the System icon to open the System window and then click the Device Manager tab.
3. Remove the parallel port by clicking Ports, selecting the port and clicking the Remove button.
4. Shut down Windows.
5. Restart or Reset the computer.
6. Enter the PC BIOS setup. This is usually done by hitting the DEL key or ESC key during the boot sequence. Consult the computer manuals or contact the manufacturer for more information about entering BIOS setup.
7. Find the parallel port setup options and set the port to be SPP (not ECP or EPP). Also, make sure there is no DMA activity on the port.
8. Save the BIOS settings and exit setup.
9. Restart the computer and allow Windows to start up. Windows should find the port and install it using the new settings.

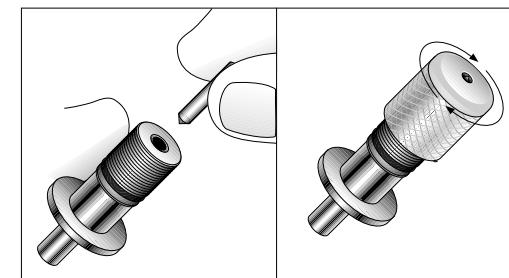
## ROUTINE MAINTENANCE

### Replacing the Blade

**Note: The blade tip is sharp and fragile, be careful when handling it.**

Blades are supplied in the optional cutting kit. If cut quality suddenly degrades the blade might be dull or broken. The tip of the blade is very fragile and can chip or break if dropped. It is difficult to see when the blade is damaged. A magnifying glass can be helpful. To replace the blade:

1. Remove the adjustable blade foot by unscrewing it counterclockwise.
2. Remove the old blade with a pair of needle nose pliers and discard it.
3. Slide the new blade into the blade until it bottoms out. The blade should spin freely.
4. Screw the foot onto the blade holder (clockwise). Stop just before the blade tip emerges.



**Figure 21. Replacing the Blade.**

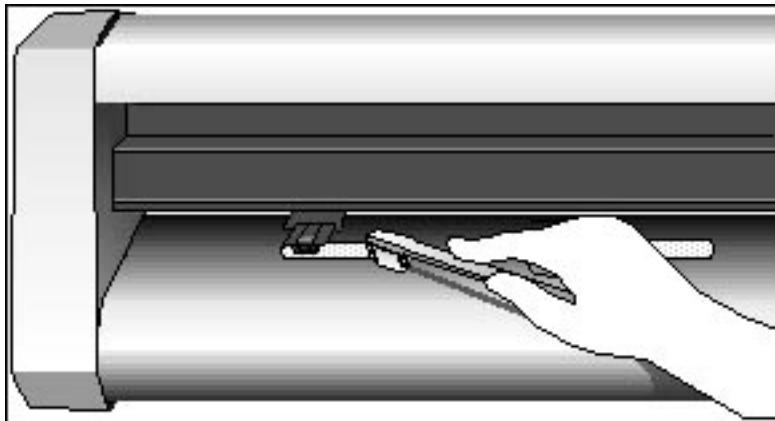
5. Perform test plots as described in the **Plotting a Pattern** section before continuing to use the plotter.

### Cleaning the Drive Shaft

**Warning: Do not use any cleaning agents (beside alcohol), water or brushes with metal bristles to clean parts of the plotter. Pay special attention to keeping the drive shaft bearings free of all liquids**

Clean the drive shaft regularly to make sure the plot lines remain accurate. To clean the drive shaft:

1. Turn off the plotter and disconnect the power cord.
2. Remove any accumulated dust and residue with a stiff bristle brush.



**Figure 22.** Cleaning the Drive Shaft.

## Calibration

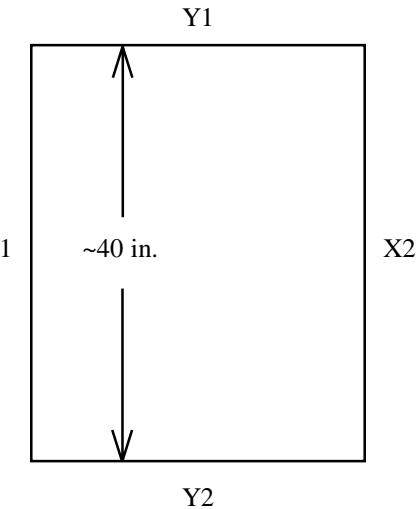
Over time, plotters may require calibration to account for normal wear and tear. Typically, the accuracy of a plot is within 0.2% overall. By using the calibration feature, the variance can be adjusted to within 0.05%. **Note:** The **Scale** command does not effect the calibration values.

### Prepare the Plotter:

1. Open the **Ioline Control Center** program. Put the plotter in **Start** mode (green LED).
2. Load the plotter with material that is greater than 30 inches wide and a minimum of 48 inches long. Install a blade holder (use media material) or pen (use paper material) in the carriage. Enable **Roll Feed** or manually create a service loop of material.
3. Move the carriage and material with the **Arrow** keys so that the blade or pen is about one inch from both the right and front edge of the material. Set an origin. See the **Operation** chapter for more details on preparing to plot.

### Gather the Calibration Data:

1. Select **Calibrate, Calibrate Plotter** from the Control Center menu bar.
2. Select **Calibration Plot** to plot the factory stored calibration plot. The plotter will Draw a large box (see Figure 14).
3. Precisely measure both X-axis and Y-axis lines. Better accuracy in measurement equals better calibration.
4. Measure both sides and the top and bottom of the box.



**Figure 23.** The Calibration Box and Measurements.

5. Take the average of the horizontal (Y) values by adding them together and dividing by 2. Repeat this procedure for the vertical (X) values.

Example:

If  $X1 = 39.750$  in. and  $X2 = 39.700$  in.

The sum is  $79.450$  in. ( $39.750$  in. +  $39.700$  in. =  $79.450$  in.).

The average is  $39.725$  in. ( $79.450$  in. / 2 =  $39.725$  in.)

The X calibration value is the average,  $39.725$  in.

### Enter the Calibration Data:

1. Enter the measured values in the boxes in the Calibration window. Make sure the plotter is in **Start** mode (green LED). Select the **Set Calibration** button.
2. The plotter will send the calibration values and the new **Calibration Setting** will be displayed in the boxes in the window.
3. Click on **Done** when finished.

## END NOTES

### Getting Help

Ioline is committed to providing the highest quality service and support to its customers. If you need assistance with an Ioline plotter, a number of resources are available:

1. First, refer to this User Guide for answers to your specific questions.
2. Consult the support section of the Ioline web site: [www.ioline.com](http://www.ioline.com).
3. For additional assistance, contact your local dealer or Ioline Customer Service. Contact information is listed on the last page of this User Guide.

Any warranty servicing of this product **not** specifically described in this manual must be authorized in writing by Ioline Customer Service. You may obtain service by calling or faxing Ioline Customer Service. The technicians will help you determine the nature of the problem. If factory repair is necessary, you will receive a RMA (Return Material Authorization). Please gather the information indicated in the next column before contacting Ioline or your dealer.

1. Carefully package the plotter in its original container or equivalent. You may purchase shipping containers from Ioline by contacting Ioline Customer Service. **Ioline is not responsible for any damage due to inadequate or improper packaging.**
2. Carefully wrap and secure all items in the shipping container to prevent damage. Seal the container and note the RMA near the address block.
3. Ship the container using FED-EX or another approved carrier. **COD SHIPMENTS ARE NOT ACCEPTED.** You will be contacted prior to the start of work with an estimate of repair cost. All repairs are warranted for 90 days.

Please gather the following information about your Plotter before contacting Ioline or the dealer for technical support.

Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Fax: \_\_\_\_\_

Model: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Dealer: \_\_\_\_\_

Type of Material Used: \_\_\_\_\_

Type of Computer: \_\_\_\_\_

Type of design software: \_\_\_\_\_

New Software or Peripherals: \_\_\_\_\_

Service History (if any): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Note: Ioline Customer Service contact information is listed on the last page of this section.**

## The FCC Wants You to Know...

This equipment generates and uses radio frequency energy and, if not installed and used properly (in strict accordance with manufacturer instructions), it may cause interference to radio and television reception. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. If this equipment does cause interference to radio or television reception - which can be determined by turning the equipment off and on - you are encouraged to try to correct the problem by one or more of the following measures:

- Use only shielded interface cables.
- Reorient the receiving antenna.
- Relocate the host computer with respect to the receiver.
- Move the host computer away from the receiver.
- Plug the host computer into a different outlet so that the host computer and receiver are on different branch circuits.

If necessary, consult the dealer or an experienced radio/television technician for additional suggestions. The following booklet, prepared by the Federal Communications Commission, is a helpful reference:

*How To Identify and Resolve Radio-TV Interference Problems:*

The stock number is: 004-000-00345-4

This booklet is available from:

**U.S. Government Printing Office**

**Washington, D.C. 20402**

## Your Comments Are Requested

Ioline Corporation is interested in comments on our documentation and products. Please send corrections or suggestions to:

**IOLINE CORPORATION**  
**14140 NE 200th Street**  
**Woodinville, WA 98072 USA**  
**Voice: (425) 398-8282**  
**Fax: (425) 398-8383**  
[www.ioline.com](http://www.ioline.com)  
[ioline@ioline.com](mailto:ioline@ioline.com)

This User Guide is provided for informational purposes only. The contents are subject to change without notice, and Ioline Corporation assumes no responsibility for any errors that may be contained herein. No part of this User Guide may be copied, disseminated, or distributed without the express written consent of Ioline Corporation.

## Customer Service

Ioline Corporation is committed to providing quality service and support to our customers. If you need assistance with an Ioline product, contact your local dealer or Ioline authorized service center. You may also contact the

### Ioline Customer Service Department

**(Monday through Friday: 7:00 A.M. - 5:00 P.M. U.S. Pacific Time)**

**Voice: (425) 398-8282**  
**Fax: (425) 398-8383**  
[techsupport@ioline.com](mailto:techsupport@ioline.com)  
[www.ioline.com](http://www.ioline.com)

Ioline has many years of experience working with pattern makers and designers. Feel free to contact us if you have questions or to share information.

## Limit of Liability Statement

It is the responsibility of the operator of the plotter to monitor the performance of the plotter and maintain it in proper working condition by following the instructions in this User Guide. It is the responsibility of the operator of the plotter to follow all safety precautions and warnings that are described in this User Guide. Ioline is not responsible for injuries that may occur as a result of unsafe operating procedures. Ioline is not responsible for substandard operational performance as a result of failure to maintain the plotter as described in this User Guide.

# GLOSSARY

## A

**Acceleration** - The rate that a plotter changes the velocity of the carriage or the media. Acceleration is measured in units of g (1 g = 32.2 ft/s<sup>2</sup>). Higher acceleration can increase *throughput* but may degrade plot quality.

**Arc** - A segment of a circle, also called a curve.

**Axis** - The geometric guidelines used to place a coordinate. Used to determine pen or blade paths for plotters.

## B

**Blade** - Refers to the carbide steel plotting tool used by pattern-plotters. Blades are specified by offset (tip distance from center) and angle (relative to media). They are designed to work with many different materials.

**Blade Bevel** - Angle of the vertical plotting edge of a blade. Larger angles help the blade travel through thicker material that produce more drag between the blade and the medium.

**Blade Offset** - The distance the blade tip trails behind the center of the blade.

**Blade Steering Arc** - The arc followed by the center of the blade as it rotates around the (fixed) tip. This is used to align the blade in the direction of the next vector so no tearing occurs.

## C

**Control Panel** - Panel on the right side of the machine where primary plotter functions are accessible. Also called the *Keypad*.

**Coordinate** - A point that can be referenced by its position on the X or Y axes of a plotter. The use of line or arc segments to connect coordinates creates paths for pens and knives to follow when plotting.

**Cut Sheet** - A single piece of material that is loaded into the plotter but is not pulled from a roll.

## D

**DM/PL** - Programming instructions language used to connect a plotter with a computer. DM/PL is used in the plotter drivers of some pattern programs.

**Drive Shaft** - The motor driven shaft that moves material through a friction feed plotter. The drive shaft has a rough surface that grips the material.

## F

**File Name Extensions** - In MS-DOS® and Windows® based programs, the three letters after the period in a file name. In pattern files the three letters denote a file type, such as the vector and bitmap based Encapsulated Postscript (EPS) and the vector based Hewlett Packard Graphics Language (PLT).

**Flange** - The projecting rim around the edge that holds the pen or blade holder to the tool carriage. The plotter automatically recognizes when a pen or blade is installed and changes plotting parameters accordingly.

**Font** - Refers to the style and width of a particular design of letters, numbers, and symbols, such as Helvetica Bold or Times Roman.

**Force** - In plotting, the downward pressure exerted on a pen or blade tip to ease plotting through materials. Additional force can be added by adjusting the Control Center **Force** settings and updating the plotter. Increasing the force will darken pen lines or aid in plotting thicker materials like tag board.

**Friction feed** - Process where the material is fed through a plotter by placing it between a motor-driven drive shaft and tensioned pinchwheels.

## G

**Gap** - The space between consecutive panels in a segmented plot. Gap can be corrected by setting the **Gap** value in the Control Center. **Roll Feed** must be enabled to set **Gap**.

## H

**HPGL Setting** - The plotter supports three industry standard plotter languages: HPGL 7475, HPGL 7596, and DM/PL. Most design software uses DM/PL or HPGL 7475 which have a lower left origin. DM/PL cannot be selected in the Control Center because the plotter will automatically recognize it. HPGL 7596 uses a center origin so plotting begins at the center of the intended plotting area.

## I

**Idler Wheel** - Secondary wheels that help keep wide material flat during plotting.

## K

**Keypad** - Panel on the right side of the machine where primary plotter functions are accessible. Also called the *Control Panel*.

## L

**Locking Flange** - Plastic rim inserted into a paper roll to support it during plotting.

**Locating Collar** - Plastic cylinder mounted on a media roller to support a locking flange.

## M

**Mil** - Thousandths of an inch or milliinches. For example; 75 mils is the same as .075 inches. 1 mil is equal to .025mm.

**Minimum Angle** - This is the minimum angle for which the machine will perform a blade steering arc.

**O**

**Offset** - The distance the tip of the blade trails behind the center of the blade.

**Origin** - Point marking the zero (0) coordinate on the X and Y axes. Used as a starting reference by plotters for pen or blade paths.

**Overset** - Distance the blade travels beyond the end of each cut vector.

**Overlap** - Amount of material plot in one panel (or tile) that duplicates what is done in the previous panel (or tile). The overlapped image allows for alignment when assembling and installing a large image.

**P**

**Panel** - Production area of a plotter. Plotters have a size limit along the Y axis (a few inches less than the width of the plotter) and the X axis. If a job exceeds the production area, consecutive panels must be set up by the pattern software. Also called tiling. Paneling a long plot will increase accuracy.

**Parallel Communications** - Method of sending information from a computer to a plotter by sending 1 byte (8 bits) at a time through a cable. This method is faster than *serial communication*. The parallel port on a PC is a female (small holes) connector.

**Plotter** - A device that uses coordinates and vectors to create images. In electronic pattern making, plotters recreate vectors on material with a set of coordinates stored in a computer file.

**Pinchwheel** - Wheeled roller, tensioned by springs, that clamps material between it and the drive shaft for transporting the material.

**R**

**Resolution** - The smallest distance that a plotter can move the material or the carriage. Plotter resolution affects the accuracy that a plot file is reproduced on the material.

**Roll Feed** - A method of pulling material from a roll for plotting and plotting. Works in conjunction with *panels*.

**S**

**Separating** - Process of pulling extraneous material away from a cut pattern leaving only the sections representing the intended design.

**Serial Communications** - Method of sending information from a computer to a plotter by sending 1 bit at a time through a cable. The serial port on a PC is a male (small pins) connector.

**Service Loop** - Slack material between the material roll and the plotter.

**T**

**Tag Board** - A heavy material (usually 150 pound) that is used in the apparel industry for plotting patterns and stencils.

**Throughput** - The speed at which a plotter completes a job. Represents the ability to process information and produce an image.

**V**

**Vector** - In computerized pattern making, a line segment between two coordinates, on which a pen or blade path can be created for plotting.

**W**

**Weeding** - Process of pulling extraneous material away from a cut pattern leaving only the sections representing the intended design.

**X**

**X - Axis** - Theoretical horizontal line providing a lengthwise reference point for plotters. Associated with media movement over the platen on the plotter.

**Y**

**Y - Axis** - Theoretical vertical line providing a longitudinal reference point for plotters. Associated with carriage movement on the plotter.

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